A.3 LONG-TERM SPACE ASTROPHYSICS

1. Scope of Program

The Long-Term Space Astrophysics (LTSA) research program is intended to provide a stable long-term source of support, up to a maximum of five years, for the selected investigators to enable investigations of appropriately large scope, and thereby also to strengthen the U.S. research community in space astrophysics. Abstracts of currently funded LTSA projects can be found on line at http://spacescience.nasa.gov/ (select "Research Solicitations" then "Past/Archive Solicitations and Selections").

This Announcement solicits proposals for research in astrophysics whose dominant emphasis is the analysis and interpretation of data from past, current, and future space astrophysics missions and from NASA space astrophysics data archives. In support of that activity, but as a secondary emphasis, the proposed research may include theoretical research, numerical modeling, use of existing data from ground-based or suborbital observations, and laboratory astrophysics measurements. In addition, NASA will consider requests for support for new ground-based observations provided that the requests are clearly described, the observations are important to the success of the proposed effort, and their expense (including salary, travel, etc.) constitutes no more than ten percent of the proposal's total budget.

The LTSA program is intended to support research in space astrophysics that is substantial and cohesive and whose duration and scope go beyond those possible by the typical three-year proposal funded by other NASA space astrophysics programs. Conversely, this LTSA program is not intended to support:

- investigations whose primary emphases are theoretical research, numerical modeling, the use of existing data from ground-based or suborbital observations, laboratory astrophysics measurements, or detector development, since there exist other NASA programs that support research with these objectives;
- investigations whose primary focus is on Solar System objects or on the solar-terrestrial interaction, since other NASA programs support these kinds of research;
- proposals primarily for the education and training of students either at the undergraduate or graduate levels;
- proposals for the organizing and/or hosting of scientific meetings;
- proposals for substantial computing facilities or resources, beyond nominal workstation or networking fees; or
- proposals that will only analyze data from the Hubble Space Telescope (HST) and/or the Chandra X-ray Observatory (CXO), since other NASA programs support these kind of research.

NASA recognizes that a proposal for a five-year research program cannot be as specific as a proposal for a small near-term research task. Nevertheless, the proposer must convincingly describe the research program with enough clarity to give peer reviewers a

clear understanding and appreciation of the proposed effort, as well as its need for a long-term period of performance. If a new proposal for this program element is itself based on a previously funded research effort, the proposal must identify that work and clearly summarize all significant results from it.

Proposals are judged on three criteria: Scientific merit of the proposed work, cost realism, and relevance of the proposed work to NASA missions and science goals. To enable the NASA Office of Space Science to properly evaluate the relevance of proposals submitted to its programs, as well as track its progress towards achieving its goals as mandated by the Government Performance Review Act (GPRA), it is mandatory that all research supported by NASA's programs demonstrate its relationship to NASA Goals and Research Focus Areas (RFAs) as stated in the latest version of its Agency and/or OSS Strategic Plans (follow links from the Web site http://spacescience.nasa.gov/); see also the discussion in Section I of the *Summary of Solicitation* of this NRA. Therefore, all proposers must explain the relevance of their proposed work not only with expository text in the main body of their proposal, but also in terms of the Goals, Science Objectives, and RFAs given in Table 1 found in the *Summary of Solicitation* of this NRA. In particular, this program element is designed to help fulfill any of the RFAs for all of the Science Objectives for Goal II of both the science theme "Astronomical Search for Origins" and "Structure and Evolution of the Universe." The appropriate place for this latter statement of relevancy is in the introduction to the proposal's "Scientific/Technical/Management" section (see Section 2.3.5 in the *Guidebook for Proposers*). The index numbers in this table may be used to identify a specific RFA, for example, "Goal I, Sun-Earth Connection Theme, RFA 1(c)" or "Goal II, Astronomical Search for Origins, RFA 3(b)."

2. Types of Proposals

For the purpose of this Announcement, NASA recognizes LTSA proposals from two different groups of researchers, "Junior Researchers" and "Senior Researchers."

- Junior Researchers are those who are early in their careers and still establishing themselves, such as postdoctoral fellows (beyond their first postdoctoral fellowship) and early tenure-track faculty. Based on the recommendations from prior cycles of the LTSA program, Junior Researchers are defined as those more than two years but fewer than ten years from having received their Ph.D. (i.e., ten years from the award of the degree). The rationale for the lower threshold is that many programs exist for first postdoctoral fellowships with durations of at least two years. The rationale for the upper threshold is that most universities with tenure-track positions make their decisions for awarding tenure by the seventh year after the candidate's Ph.D. These boundaries of "time after Ph.D." also allow equal treatment of researchers in academia, industry, Government, and other organizations. Note that in those cases where institutional restrictions prevent a Junior Researcher from proposing as a Principal Investigator, an appropriately senior and qualified staff member may submit the proposal as the Principal

Investigator on behalf of the Junior Researcher. The Junior Researcher is a Co-Investigator who also is designated as the "Science Principal Investigator." In such a case, the Junior Researcher's name and individual research program must be clearly identified in the Proposal Summary and list of investigators (see the definition of proposal personnel in the *NASA Guidebook for Proposers*). Junior Researchers are discouraged from applying for funding of post-doctoral positions under the LTSA, since Junior Researchers are typically themselves post-doctoral fellows.

• Senior Researchers are those who are more experienced, as well as better established, such as tenured faculty at the university level and senior scientists at universities and research laboratories. Such proposers may request funding for post-doctoral researchers in their proposals.

Questions regarding the eligibility for Junior or Senior categories may be directed to the LTSA Discipline Scientist at the address given below.

Support for Junior Researchers is essential to the long-term health of the U.S. research effort in space astrophysics, while the experience of Senior Researchers is needed to maximize the near-term research results in space astrophysics. The intended funds distribution for this program element will favor proposals from Junior Researchers, provided that their proposals have comparable merits with those from Senior Researchers. Approximately 50% of available funds were awarded to Junior Researchers in the last review cycle.

Because of the duration of long-term research projects that are appropriate for this LTSA program, it is possible that a substantial portion of the necessary data will need to be obtained from future space astrophysics observations. Approval of a LTSA proposal does not constitute approval of the specific observing programs contemplated or described by the proposer. It will be the proposer's responsibility to propose specific observations and to obtain the desired data via the appropriate mission-specific observing programs or archival research programs. Since the budgets of such observing or archival data analysis proposals are usually quite restricted, the holder of an LTSA award may request travel support or other unique costs from observing or archival research programs but may not duplicate any salary or other costs covered by the LTSA award.

3. Proposal Category and Research Areas

Each proposal must be identified as belonging to either the Junior Researcher or Senior Researcher category by checking the appropriate box on the *Cover Page* (see the *NASA Guidebook for Proposers*). For all proposals, the *Cover Page* also provides for designation of the data sets proposed for analysis and also of the Research Area, as defined below, that designates the primary focus of the proposal. The primary use of these Research Areas is to facilitate the assignment of each proposal to the appropriate review panel. Note that each LTSA proposal must identify one primary Research Area (a

secondary Research Area may be designated, if necessary). In any case, NASA reserves the right to reassign a proposal to a different primary or secondary Research Area. The nine defined Research Areas are:

1. *Solar System, including the Sun* (Note: proposals whose primary focus is Solar System research using the IRAS Asteroid and Comet Survey or Voyager data should be submitted to other NRAs or other program elements in this NRA that are relevant to those objectives; for this program element the acceptable solar observations are those of high-energy spectral and temporal studies of solar flares utilizing CGRO data);
2. *Star Formation and Pre-Main Sequence Stars* (including star-forming clouds, protoplanetary and debris disks, protostars, and T Tauri stars);
3. *Main Sequence Stars*;
4. *Post-Main Sequence Stars and Collapsed Objects* (including giants, isolated white dwarfs, isolated neutron stars, central stars of planetary nebulae, and gamma-ray bursts);
5. *Binary Systems* (including cataclysmic variables, x-ray binaries, and black hole binaries);
6. *Interstellar Medium and Galactic Structure* (including supernova remnants, dark clouds, interstellar dust, H II regions, diffuse galactic emission, and planetary nebulae);
7. *Normal Galaxies*;
8. *Active Galaxies and Quasars* (including interacting galaxies, starburst galaxies, Seyfert galaxies, radio galaxies, AGNs, and quasars); and
9. *Large Scale Cosmic Structures* (including clusters of galaxies, galaxy environment and evolution, intracluster medium, diffuse x-ray background, and cosmology).

4. Programmatic Information

This program was begun during the FY 1990 award cycle and currently provides support for about 100 research groups and individuals, with a budget level of approximately $8.0M per year. It is anticipated that approximately $2.0M will be available through this Announcement for this program element to fund new awards of about $140K in size per year, for a maximum of five years' duration.

IMPORTANT INFORMATION

As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (OSS) is now using a single, unified set of instructions for the submission of proposals. This material is contained in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement – 2004* (or *NASA Guidebook for Proposers* for short) that is accessible by opening URL http://research.hq.nasa.gov, and linking through the menu item "Helpful References," or may be directly accessed online at URL http://www.hq.nasa.gov/office/procurement/nraguidebook/. This NRA's

Summary of Solicitation also contains the schedule and instructions for the electronic submission of a *Notice of Intent* (NOI) to propose and a proposal's *Cover Page/Proposal Summary*, which now also includes the required *Budget Summary,* and the mailing address for the submission of a proposal.

For further information, contact the Program Officer:

Dr. Jeffrey J.E. Hayes
Astronomy and Physics Division
Code SZ
Office of Space Science
NASA Headquarters
Washington, DC 20546-0001
Telephone: (202) 358-0353
E-mail: Jeffrey.J.Hayes@nasa.gov